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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/633,032	08/04/2000	Roger Meuwly	33383-072824.0112	2332

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EXAMINER

MUSSER, BARBARA J

ART UNIT	PAPER NUMBER
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1733

DATE MAILED: 08/01/2003

161

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/633,032

Applicant(s)

MEUWLY ET AL.

Examiner

Barbara J. Musser

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 and 28-49 is/are pending in the application.
- 4a) Of the above claim(s) 28-49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This is in response to the paper dated 7/14/03 which was received after the rejection was mailed.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4, 7-9, and 11-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Green(U.S. Patent 4,092,443) in view of Pratt(U.S. Patent 5,145,621)

Green discloses a method of manufacturing a composite part wherein sheets of unidirectional fibers are impregnated with resin, at least partially cured using actinic radiation, shaped and stacked, and fully cured using heat.(Abstract) The reference does not specifically disclose stacking the layers in a mold prior to finally curing them. Pratt discloses it is well-known and conventional to stack layers of partially cured unidirectional fiber-reinforced material in a non-planar support and consolidating them to remove voids.(Col. 5, ll. 41-50; Col. 5, ll. 66- Col. 6, ll. 7) It would have been obvious to one of ordinary skill in the art at the time the invention was made to stack the layers on the support of Pratt prior to finally curing them since the device of Pratt would allow formation of the multi-layered shaped part of Green without voids which would reduce the strength of the final structure(Col. 6, ll. 2-8) particularly since Green discloses the

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sheets can be stacked and shaped, indicating they are formed into a nonplanar shape.(Abstract)

Sheets of unidirectional fibers are considered to have the fibers substantially parallel in one plane as that is the conventional description of a sheet of unidirectional fibers.

While the claims are not restricted to polymerizing using ionizing radiation only to a specific depth, it is noted that Green discloses a variety of irradiation times, indicating that some of the sheets are only partially cured.(Col. 17, ll. 18; Col. 18, ll. 53) Since these layers are cured to at least the amount shown in applicant's examples, one in the art would appreciate that the fibers would not buckle as applicant's do not buckle.

While the references do not specifically state the prepregs are fitted snugly against each other and the support, Pratt stacks the layers and consolidates them to form a laminate without gaps between the layers, indicating the layers fit snugly against each other.

Regarding claim 2, one in the art would appreciate that any type of mold could be used as a molding surface.

Regarding claims 3, 4, 8, and 9, the references do not disclose how much of the radiation-curable resin is cured, though it does indicate that different amounts can be cured.(Examples) One in the art would appreciate that the portion of the sheet closest to the radiation source would cure first and that the specific amount of curing would be within the purview of one in the art. The claimed ranges are simply methods of

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categorizing the percentage of resin cured, and the use of such methods to determine the amount of cure would be within the skill of one in the art.

Regarding claim 7, one in the art would appreciate that the temperature of molding/final curing would be above the glass transition temperature of the resin so that the resin would flow to form a unified structure as is desired in prepregs.

Regarding claim 11, Pratt discloses applying pressure to the stack to force out the air.(Col. 6, ll. 17-22)

Regarding claims 12-14, many resins when partially cured, particularly when also containing a second curing agent, are not tacky. When using these type of resins, it would have been obvious to one of ordinary skill in the art at the time the invention was made to temporarily adhere the layers together to prevent slippage relative to one another during molding.

Regarding claim 12, one in the art would appreciate that one way to temporarily bond the layers together would be to use an adhesive layer, such as one formed from the resin used to impregnate the fibers. Partially curing a layer of this material between the pre-preg layers would bond it to the prepregs and it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a layer of the same type of resin as using in impregnating the prepreg as an adhesive and cure it so that the layers are temporarily bonded together, preventing them from shifting prior to curing.

Regarding claim 13, since during curing the layers bond together, it would have been obvious to one of ordinary skill in the art at the time the invention was made that

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the layers could be temporarily bonded together by partially curing them together prior to the final cure.

Regarding claim 14, it would have been obvious to one of ordinary skill in the art at the time the invention was made to temporarily bond the layers together using an adhesive since this would prevent the layers from shifting prior to curing. Such adhesives are conventionally high-viscosity.

Regarding claim 15, it is well-known and conventional in the chemical arts that increasing the temperature of a liquid decreases its viscosity. Therefore, when one in the art would desire to decrease viscosity of the resin during impregnation, the temperature of the resin would be raised.

Regarding claim 16, the resin can be an ester.(Col. 2, ll. 54-55)

Regarding claim 17, the resin can be an epoxy.(Col. 3, ll. 67-68)

Regarding claims 18 and 19, the resin can contain styrene.(Col. 4, ll. 1-2) One in the art would appreciate that changing the amount of the components present in the mixture.

Regarding claim 20, Green discloses the mixture contains a photo-initiator which is polymerized using ultraviolet radiation.(Abstract; Col. 15, ll. 66)

Regarding claim 21, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use any conventional type of photo-initiator in the resin mixture, particularly since Green discloses that suitable initiators are well-known.(Col. 15, ll. 12-16) Absent unexpected results, this is considered obvious.

Regarding claims 22 and 23, the reference discloses the fibers can be glass or carbon.(Col. 2, ll. 29-33)

3. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Green and Pratt as applied to claim 1 above, and further in view of Cook et al.

The references cited above do not disclose whether the prepregs are stacked individually or in groups when they are stacked on the molding surface. Cook et al. discloses the prepregs can be stacked individually or in groups on the mold surface depending on the desired overlap pattern.(Col. 5, ll. 5-9) It would have been obvious to one of ordinary skill in the art at the time the invention was made that the prepregs could be stacked individually or in groups on the mold since they are obvious alternatives in the art and particularly since Cook et al. discloses the prepregs can be stacked individually or in groups on the mold surface depending on the desired overlap pattern.(Col. 5, ll. 5-9)

4. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Green and Pratt as applied to claim 1 above, and further in view of Dickerson(U.S. Patent 4,065,340).

The references cited above do not disclose curing the resin in the absence of oxygen. It is well-known and conventional in the molding arts to vacuum form articles containing fiber reinforced resin as shown for example by Dickerson which discloses partially curing the prepregs under vacuum.(Col. 1, ll. 65-67) It would have been obvious to one of ordinary skill in the art at the time the invention was made to cure the prepregs under vacuum as shown for example by Dickerson for the well-known and

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5. Claims 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spragg et al., in view of Markow et al. and Green.

Spragg et al. discloses using bands containing thermosetting materials as run-flat elements in a tire. These bands are coated with a rubber mixture to aid in bonding to the rest of the tire.(Abstract; Col. 6, ll. 46-50) The reference discloses the bands can contain thermosetting resins but is silent as to their exact structure.(Col. 2, ll. 10-14) The reference does refer to Markow for an example of the band.(Col. 1, ll. 38-48) Markow et al. discloses the band can be a layer containing thermosetting resin and fibers.(Col. 2, ll. 47-50) It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the band of Markow et al. in Spragg et al. since Spragg et al. discloses that Markow is the type of band the reference is intended to be used with.(Col. 1, ll. 38-48)

The references do not disclose the specifics of the fiber reinforced resin or how it is formed. Green discloses impregnating radiation curable and heat-curable resin into unidirectional fibers, at least partially curing the radiation curable resin, forming the prepregs into an article, and curing the heat-curable resin to form the final product.(Abstract) These prepregs are made of the same materials used in tires, namely steel.(Col. 2, ll. 29-30) It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the prepreg of Green in the run-flat tire of Spragg et al. and Markow et al. since this method allows the prepreg to be cure to a formable solid state where it can be applied to a tire.

Markow discloses the band can be formed using multiple strips of prepreg.(Figure 3) As the rubber is intended to be cured(Col. 6, ll. 55-58), it is assumed to be sulfur-curable, since that is the well-known and conventional method of curing rubber.

While the references do not specifically state the prepregs are fitted snugly against each other and the support, one in the art would appreciate that the prepregs would be fitted snugly against each other to prevent gaps which would reduce the strength of the final product as is known in the art.

Regarding claim 26, Spragg et al. discloses the partially cured rubber and the band are fully cured in the final molding operation.(Col. 7, ll. 6-7)

6. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spragg et al., Markow et al., and Green as applied to claim 24 above, and further in view of Voss et al.

Spragg et al. discloses the fiber/resin layer is bonded to the rubber using an adhesive cement, but does not disclose the specific compound.(Col. 6, ll. 47-49) Voss et al. discloses it is well-known and conventional in the tire art to use resorcinol formaldehyde latex glue to bond rubber to synthetic fibers.(Col. 1, ll. 31-35) It would have been obvious to one of ordinary skill in the art at the time the invention was made to use resorcinol formaldehyde latex glue to bond the band, made of resin-impregnated fibers, to the rubber of Spragg et al. since it is the conventional glue used in the art for bonding synthetic fibers to rubber.(Col. 1, ll. 31-35)

Response to Arguments

Regarding applicant's statement that a "solid" precomposite will not expand, this suggests the resin is at a greater cure than the gelling stage. Applicant appears to be suggesting the precomposites are solids by the conventional definition of solid, i.e. a material that does not flow under moderate stress and has a capacity for resisting compression. If so, applicant should claim such. Examiner is uncertain how such solids would be able to bond to themselves without application of adhesive.

Applicant has argued that in the prior art, solid prepregs have been molded against a nonplanar surface, but that such has caused stress in the final product. It is unclear how applicant's prepregs are different from those described in the arguments(pg. 11) as both are solid prepregs formed against a nonplanar surface.

Regarding applicant's argument that the references do not disclose the precomposites having reactive surfaces, the claims do not require such.

Regarding applicant's arguments that the references do not show the fibers are resistant to buckling, Green cures the prepregs for 30 to 60 seconds, within the range applicant shows forms prepregs resistant to buckling(Pg. 20) Therefore the prepregs of Green would also be resistant to buckling.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Barbara J. Muss** whose telephone number is (703)-

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305-1352. The examiner can normally be reached on Monday-Thursday; alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Ball can be reached on 703-308-2058. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



BJM
July 29, 2003



Michael W. Ball
Supervisory Patent Examiner
Technology Center 1700